INTERMOUNTAIN POWER SERVICE CORPORATION
INTERMOUNTAIN GENERATING STATION 1 & 2
HP TURBINE RETROFIT

8.2.   ROTOR BALANCING

Grooves machined into the rotor shaft before stage 1 and after stage 8, permit the attachment of balancing weights. The weights are located in the appropriate groove and are retained in position by locking screws.

Additionally a series of 30 tapped holes around the rotor at each end enable further trim balance weights to be secured to the rotor at site, accessible through the outer gland covers.

9.   ROTOR SHAFT SEALS (Figs. 1 and 10)

9.1.   GENERAL

Steam leakage across the rotor shaft is minimized by three gland assemblies designated as the HP front gland assembly, the HP inlet gland assembly and the HP rear gland assembly.

The existing HP front and rear gland assemblies are retained. For details of these glands, refer to the existing station manual.

9.2.   HP INLET SHAFT GLAND (Fig. 10)

The HP inlet shaft gland assembly is positioned at the rear of the HP inner cylinder and engages with stage 1 diaphragm. A deflector is fitted to the front of the gland carrier between the inner cylinder and stage 1 diaphragm to form the steam inlet annulus flow guide.

The HP inlet shaft gland is housed in a gland carrier which is constructed from top and bottom half, low alloy steel castings. They are bolted together at the horizontal joint and remain in the bottom half cylinder when the top half cylinder is removed.

Jacking screws are provided for maintenance purposes.

The carrier is supported on suspension keys attached to the inner cylinder, transverse location is provided by a single key on the module centerline integral with the lower half gland carrier and engaging in a keyway machined in the inner cylinder.

The carrier is located axially by an integral collar which engages a machined groove in the bore of the inner cylinder. A spring loaded seal is located between the rear face of the collar and the inner cylinder groove to minimize steam leakage.

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APPENDIX No.2 – COMPARISON TABLE

TYPE 28	TYPE 23	TYPE 18	TYPE 10
RANGE OF WEIGHTS FOR BALANCING			
from 10 to 360 g	from 5 g to 180 g	from 3 g to 108 g	from 1 g to 36 g
Possible balancing accuracy (without rectifying the weights)			
to the nearest 10 g	to the nearest 5 g	to the nearest 3 g	to the nearest 1 g

Designation of balancing weights

28/17	28/21	28/28	23/13	23/15	23/20	18/12	18/14	18/19	10/10	10/12	10/16

Weight of each balancing weight in g

50	60	80	25	30	40	15	18	24	5	6	8

Each cell heading below: *Weight to be added (g)* and *Number and length of balancing weights in area X / Y*.

TYPE 28 (28/17 = 50 g, 28/21 = 60 g, 28/28 = 80 g)

Weight (g)	area X	area Y	Weight (g)	area X	area Y
10	1x21	1x17	190	1x17 1x21 1x28	–
20	1x28	1x21	200	2x21 1x28	–
30	1x28	1x17	210	1x17 2x28	–
40	2x21	1x28	220	1x21 2x28	–
50	1x17	–	230	1x17 3x21	–
60	1x21	–	240	3x21	–
70	2x21	1x17	250	1x17 2x21 1x28	–
80	1x28	–	260	3x21 1x28	–
90	1x21 1x28	1x17	270	1x17 1x21 2x28	–
100	2x17	–	280	2x21 2x28	–
110	1x17 1x21	–	290	1x17 3x28	–
120	2x21	–	300	1x21 3x28	–
130	1x17 1x28	–	310	1x17 3x21 1x28	–
140	1x21 1x28	–	320	4x28	–
150	3x17	–	330	1x17 2x21 2x28	–
160	2x28	–	340	2x17 3x28	–
170	1x17 2x21	–	350	1x17 1x21 3x28	–
180	3x21	–	360	2x21 3x28	–

TYPE 23 (23/13 = 25 g, 23/15 = 30 g, 23/20 = 40 g)

Weight (g)	area X	area Y	Weight (g)	area X	area Y
5	1x15	1x13	95	1x13 1x15 1x20	–
10	1x20	1x13	100	2x13 1x20	–
15	1x20	1x13	105	1x13 2x20	–
20	2x15	1x20	110	1x15 2x20	–
25	1x13	–	115	1x13 3x15	–
30	1x15	–	120	3x20	–
35	2x15	1x13	125	1x13 2x15 1x20	–
40	1x20	–	130	3x15 1x20	–
45	1x15 1x20	1x13	135	1x13 1x15 2x20	–
50	2x13	–	140	2x15 2x20	–
55	1x13 1x15	–	145	1x15 3x20	–
60	2x15	–	150	1x15 3x20	–
65	1x13 1x20	–	155	1x13 3x15 1x20	–
70	1x15 1x20	–	160	4x20	–
75	3x13	–	165	1x13 2x15 2x20	–
80	2x20	–	170	2x13 3x20	–
85	1x13 2x15	–	175	1x13 1x15 3x20	–
90	3x15	–	180	3x15 3x20	–

TYPE 18 (18/12 = 15 g, 18/14 = 18 g, 18/19 = 24 g)

Weight (g)	area X	area Y	Weight (g)	area X	area Y
3	1x14	1x12	57	1x12 1x14 1x19	–
6	1x19	1x14	60	2x14 1x19	–
9	1x19	1x12	63	1x12 2x19	–
12	2x14	1x19	66	1x14 2x19	–
15	1x12	–	69	1x12 3x14	–
18	1x14	–	72	3x19	–
21	2x14	1x12	75	1x12 2x14 1x19	–
24	1x19	–	78	3x14 1x19	–
27	1x14 1x19	1x12	81	1x12 1x14 2x19	–
30	2x12	–	84	2x14 2x19	–
33	1x12 1x14	–	87	1x12 3x19	–
36	2x14	–	90	3x14 3x19	–
39	1x12 1x19	–	93	1x12 3x14 1x19	–
42	1x14 1x19	–	96	4x19	–
45	3x12	–	99	1x12 2x14 2x19	–
48	2x19	–	102	2x12 3x19	–
51	1x12 2x14	–	105	1x12 1x14 3x19	–
54	3x14	–	108	2x14 3x19	–

TYPE 10 (10/10 = 5 g, 10/12 = 6 g, 10/16 = 8 g)

Weight (g)	area X	area Y	Weight (g)	area X	area Y
1	1x12	1x10	19	1x10 1x12 1x16	–
2	1x16	1x12	20	2x12 1x16	–
3	1x16	1x10	21	1x10 2x16	–
4	2x12	1x16	22	1x12 2x16	–
5	1x10	–	23	1x10 3x12	–
6	1x12	–	24	3x16	–
7	2x12	1x10	25	1x10 2x12 1x16	–
8	1x16	–	26	3x12 1x16	–
9	1x12 1x16	1x10	27	1x10 1x12 2x16	–
10	2x10	–	28	2x12 2x16	–
11	1x10 1x12	–	29	1x10 3x16	–
12	2x12	–	30	1x12 3x16	–
13	1x10 1x16	–	31	1x10 3x12 1x16	–
14	1x12 1x16	–	32	4x16	–
15	3x10	–	33	1x10 2x12 2x16	–
16	2x16	–	34	2x10 3x16	–
17	1x10 2x12	–	35	1x10 1x12 3x16	–
18	3x12	–	36	2x12 3x16	–

DRAWN	THIRD ANGLE PROJECTION	GEC ALSTHOM
B.R.M	⊕ ◁	
TRACED		**TITLE**
CHECKED		FITTING OF ROTOR BALANCE WEIGHT
E. LLOYD		

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